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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
WU, QING YUAN

ART UNIT	PAPER NUMBER
2194	

DATE MAILED: 06/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/3/05*.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9,11-18,20-37,39-44,46,48 and 49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7, 9, 11-18, 20-37, 39-44, 46, and 48-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

1. -   Claims 1-7, 9, 11-18, 20-37, 39-44, 46, and 48-49 are pending in the application.

Claim Objections

2.   Claims 1, 13 and 39 are objected to because of the following informalities: "one <u>ore</u>

more" should read --one or more--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

4.   Claims 1-7, 9, 11-18, 20-37, 39-44, 46, and 48-49 are rejected under 35 U.S.C. 112,

second paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which applicant regards as the invention.

        a.   The following terms lacks antecedent basis:

                i.   The thread scheduling mechanism- claims 4 and 15.

        b.   The following claim language is indefinite:

                i.   As per claim 1, it is uncertain whether "the wake-up time" in lines 20-21

        refers to "a wake-up time <u>equivalent to the predetermined amount of time</u>" (i.e.

        applicant should consider using consistent terms to properly refer to the

        antecedent). Claims 1, 13 and 39 are rejected for the same reason.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth
> in section 102 of this title, if the differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

6.   Claims 1-7, 9, 11-18, 20-37, 39-44, 46, and 48-49 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Applicant Admitted Prior Art (hereafter AAPA), in view of Young (U.S.

Patent 6,609,161).

7.   Young was cited in the last office action.

8.   As to claim 1, AAPA teaches the invention substantially as claimed including managing a

single-dimension sleep queue implemented as a linked list, the managing comprising:

identifying a thread of execution to insert into a sleep queue for a predetermined amount

of time;

responsive to the identifying, inserting the thread of execution into a sleep queue [AAPA,

pg. 2, lines 8-19].

9.   AAPA does not specifically teach inserting a thread of execution to a first dimension of a

multi-dimensional queue if there is not a thread with a wake-up time equivalent to the

predetermined amount of time in the first dimension. However, AAPA disclosed sorting threads

based on wake-up time and thread priority in a sleep queue [AAPA, pg. 3, lines 6-8]. In

addition, Young disclosed managing a multi-dimensional queue [Young, 255, Fig. 3A; 260A,

Fig. 3B], and inserting a thread of execution to a first dimension of the multi-dimensional queue

if there is not a SCB with the same/equivalent target number [Young, col. 5, lines 46-51; col. 6,

lines 1-7; Fig. 3C; Fig. 6]

10.   It would have been obvious to one of ordinary skill in the art, to have combined the

single-dimensional sleep queue of AAPA with Young's multi-dimensional queue because

Young's system has the ability to detach/removed a group of SCB independent of the number of

SCBs in the group, that are linked in a queue to avoid multiple access to the queue [Young, col.

4, lines 12-17], thereby resolving AAPA's issue by eliminating the non-deterministic amount of

time that will be spend on removal and insertion of threads [AAPA, pg. 4, lines 21-22]. The

combination of AAPA and Young's system will yield a deterministic thread management system

as described by AAPA.

11.   Furthermore, AAPA and Young does not specifically teach if there are one or more

different threads of execution with the wake-up time in a second dimension of the multi-

dimensional sleep queues each of the one or more different threads of execution has a thread

priority lower than or equal to a thread priority associated with the thread of execution.

However, Young disclosed if a valid tail pointer exists for a target device (i.e. same wake-up

time) appending the new SCB to the end of the target queue, in which SCB priorities are based

on order of arrival [Young, col. 5, lines 52-60; col. 8, lines 31-34]. In addition, AAPA disclosed

sorting threads based on wake-up time and thread priority in a sleep queue [AAPA, pg. 3, lines

6-8].

12.   It would have been obvious to one of ordinary skill in the art, to have recognized that

both the teaching of AAPA and Young execute/process threads/SCBs according to a priority

scheduling semantic and the SCBs in the first dimension of Young's multi-dimensional queue

have the higher priority over other SCBs in its corresponding second dimension target queue

base of the priority scheduling semantic.

13.   As to claim 2, AAPA as modified teaches the invention substantially as claimed

including wherein the multi-dimensional sleep queue is a real-time multi-dimensional sleep

queue [AAPA, pg. 1, lines 16-18].

14.   As to claim 3, AAPA as modified teaches the invention substantially as claimed wherein

the multi-dimensional sleep queue is a two-dimensional sleep queue [Young, abstract; Fig. 3B].

15.   As to claims 4-5, these claims are rejected for the same reason as claim 1 above.

16.   As to claim 7, AAPA as modified teaches the invention substantially as claimed wherein

the predetermined amount of time is a wake-up time and wherein the thread of execution has a

priority [AAPA, Fig. 2; pg. 3, lines 3-14]; and wherein inserting the thread of execution into the

multi-dimensional sleep queue further comprises:

> sorting the thread of execution into the first dimension of threads and sorting the thread
>
> of execution into a second dimension, the thread of execution being sorted first with
>
> respect to the first dimension and second with respect to the second dimension [Young,
>
> col. 5, line 52 to col. 6 line 18; col. 8, lines 30-60].

17.   AAPA as modified does not teach the first dimension of threads being sorted based on

respective thread wake-up times, the second dimension of threads being sorted based on

respective thread priorities. However, Young disclosed sorting the first dimension common

queue based on the order of arrival and having only one SCB per target [Young, col. 2, lines 9-

11; col. 4, line 63; 275, Fig. 3B; 402, 405-408, Fig. 4], the second dimension target queue sorted

based on the order of arrival and having one specific target [Young, col. 5, lines 6-7; 270A-

272A, Fig. 3B; 401-404, Fig. 4].

18.   It would have been obvious to one of ordinary skill in the art, to have substituted the

parameters in Young's two-dimensional queue with AAPA's parameters, a wake-up time and a

priority. The combination would resolve the defect of AAPA as stated above in claim 1. All in

all, the changes and modifications made did not depart from Young's system in a broader aspect.

19.   As to claim 6, this claim is rejected for the same reason as claims 1 and 7 above.

20.   As to claim 9, AAPA as modified teaches the invention substantially as claimed in claim

7. In addition, AAPA as modified teaches each thread in the second plurality having a same

respective thread wake-up time [Young, same target; 270A-272A, Fig. 3B].

21.   As to claims 11-12, these claims are rejected for the same reason as claims 1-7 above.

22.   As to claims 13-18 and 20-23, these claims are rejected for the same reason as method

claims 1-7, 9, and 11-12 above.

23.   As to claim 24, AAPA as modified in claim 1 teaches the invention substantially

including a method for managing a multi-dimensional sleep queue comprising:

      inserting a new thread into the multi-dimensional sleep queue using a multi-dimensional

atomic walk procedure [Young, col. 5, line 42 to col. 6 line 18; Fig. 4]; and

      removing the new thread from the multi-dimensional sleep queue for insertion into a run

queue [AAPA, pg. 4, lines 10-12].

24.   As to claim 25, AAPA as modified teaches the invention substantially as claimed in ·

claim 24 including wherein inserting the new thread further comprises:

if the new thread is a first thread, settling a last examined thread to reference the new

thread, the last examined thread being used to identify an insertion point for the new thread

[Young, col. 6, lines 1-29].

25.   As to claims 26-27, these claims are rejected for the same reason as claim 6 above.

26.   As to claim 28, this claim is rejected for the same reason as claim 1 above.

27.   As to claim 29, this claim is rejected for the same reason as claims 1 and 7 above.

28.   As to claim 30, AAPA as modified teaches the invention substantially as claimed in

claim 29. AAPA as modified does not specifically teach determining a status of a last examined

thread and searching for thread insertion point to insert threads based on the status. However,

Young disclosed a scratch memory that stores the value of tail pointers that points to the last

SCB in the queues [Young, 350, Fig. 3A; 404, 407-408, Fig. 4].

29.   It would have been obvious to one of ordinary skill in the art, to have recognized that

changes in the status of the last examined thread can be used to determining a starting point for

insertion because doing so will yield a more optimized insertion procedure by not having to

traverse the entire queue to locate an insertion point if the status of a last examined thread does

not change.

30.   As to claims 31-37, these claims are rejected for the same reason as method claims 24-30

above.

31.   As to claims 39-44, 46, and 48-49, these claims are rejected for the same reason as claims

1-7, 9, 11-18, and 20-37 above.

Response to Arguments

32.   Applicant's arguments filed 1/3/05 have been fully considered but they are not

persuasive.

33.   In the remarks, Applicant argued in substance that:

a.   AAPA in view of Young does not teach or suggest the features of claims 1, 13,

39.

b.   References do not teach of suggest "sorting the thread of execution into the

second dimension based on respective thread priorities."

c.   References do not teach or suggest any more complex object evaluation and

insertion procedure such as that provided by the claimed "atomic walk procedure."

    d.   Nowhere does AAPA in view of Young teach or suggest "a last examined node/thread."

34.   Examiner respectfully traversed Applicant's remarks:

35.   As to point (a), please see the rejections for these claims above.

36.   As to point (b), AAPA teaches executing threads in a first-in-first-out round robin fashion. Young teaches the priority of SCB execution is maintained according to the order of delivery by host system and that new SCB is appended (sorted) to the end of a target queue (i.e. newly arrive SCB has a lower priority comparing to SCBs already in the target queue) [Young, col. 8, lines 30-60], therefore in combination AAPA in view of Young meets this limitation.

37.   As to points (c), Applicant's claimed invention does not support applicant's arguments. Claimed subject matter, not the specification, is the measure of invention. Limitations in the specification cannot be read into the claims for the purpose of avoiding the prior art. If Applicant believes the limitation is important feature of the invention, it should be incorporated into the claims for further consideration. In re Self, 213 USPQ 1,5 (CCPA 1982); In re Priest, 199 USPQ 11,15 (CCPA 1978). Examiner further clarify the mapping to the Young patent to show support for this limitation. See rejection for claim 24 above.

38.   As to point (d), applicant fails to explain why the mapping of the examiner's rejection

based on AAPA in view of Young do not meet this limitation. AAPA in view of Young clearly

teach reading the common tail pointer to determined location of the last SCB in the common

queue prior to appending the new SCB in to the common queue [Young, col. 6, lines 1-29].

39.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from

the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the

mailing date of this final action and the advisory action is not mailed until after the end of the

THREE-MONTH shortened statutory period, then the shortened statutory period will expire on

the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

calculated from the mailing date of the advisory action. In no event, however, will the statutory

period for reply expire later than SIX MONTHS from the mailing date of this final action.

40.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Qing-Yuan Wu whose telephone number is (571) 272-3776. The

examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Qing-Yuan Wu

Examiner

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